

# REMARKS

Claims 1-4, 9, 12-14, 16-19, 21-23, 25-30, 32, 33, and 34-44 are pending. Claims 1, 16, 27, and 33 are amended.

Claims 1-4, 9, 12-14, 16-19, 21-23, 25, and 26 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent no. 5,856,174 to Lipshutz ("Lipshutz").

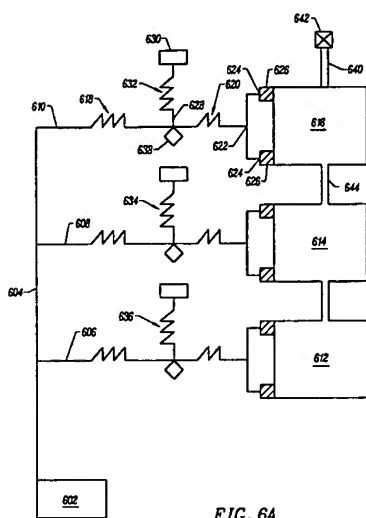
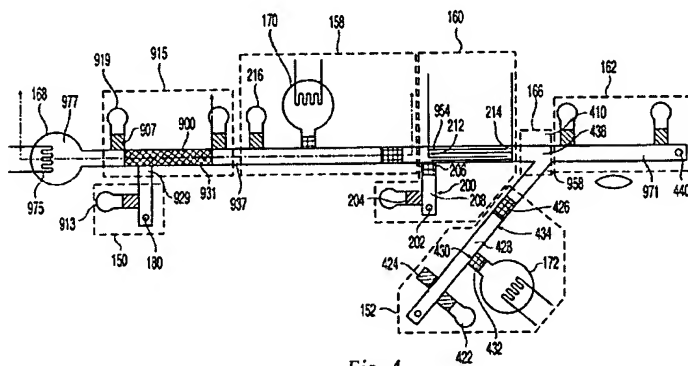


FIG. 6a of Lipshutz reproduced here shows a device having multiple reaction chambers 612, 614, 616, a vacuum source 602, and a pressure/vacuum manifold.<sup>1</sup> The manifold is formed by main vacuum channel 604 and branch channels 606, 608, 610 that connect vacuum source 602 to the multiple reaction chambers.<sup>2</sup> Each branch channel has a vent 630 and a sealable opening 638 to ambient pressure.<sup>3</sup>

Claim 1 requires a device having a thermopneumatic actuator connected to a channel only upstream of a lysing zone. Claim 16 requires a device having a gas actuator connected to a channel only upstream of the lysing zone. An example of a device

having an actuator 170 connected to a channel only upstream of a lysing region 160 is shown in FIG. 4 of the present application reproduced here.

Lipshutz does not disclose or suggest the devices of claims 1 and 16. For example, branch channel 608 of Lipshutz connects vacuum source 602 to a location downstream of reaction chamber 616; branch channel 606 connects vacuum source 602 to a location downstream of reaction chamber 614; and branch channel 606 connects vacuum source 602 both upstream of and to reaction chamber 612 itself. Hence, vacuum source 602 cannot be an actuator connected



<sup>1</sup> Lipshutz, col. 21, line 53 to col. 24 line 34.

<sup>2</sup> Id.

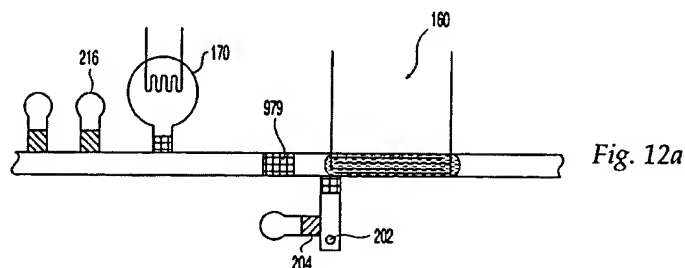
<sup>3</sup> Id.

to a channel only upstream of a lysing zone as required by claims 1 and 16. No other disclosure of Lipshutz satisfies either claim 1 or claim 16.

Applicants submit that the rejection of claims 1 and 16 has been overcome in view of the foregoing.

Claims 27-30, 32, 33, and 35-37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lipshutz.<sup>4</sup>

Claim 27 requires propelling a microdroplet toward a lysing mechanism by increasing a gas pressure upstream of the microdroplet, and venting gas from upstream of the microdroplet to reduce the upstream pressure and stop the cell-containing microdroplet in a lysing position with respect to a lysing mechanism of a microfluidic device. An illustration of a venting step is illustrated in FIG. 12a of the present application reproduced here. Vent 202 vents gas from upstream of a microdroplet.



Lipshutz's devices do not perform the required steps of increasing a gas pressure upstream of a microdroplet and venting gas from upstream of the microdroplet to stop the microdroplet. For example, the vents and sealable openings of FIG. 6A introduce gas into the microfluidic device.<sup>5</sup> The pressure manifold creates increasing pressure in downstream reaction chambers.<sup>6</sup> The sealable openings 656 of FIG. 6B force sample from one chamber to another rather than stopping the sample.<sup>7</sup> Moreover, there is no motivation in Lipshutz or elsewhere in the cited art to modify Lipshutz to perform the claimed method.

Applicants submit that the rejection of claim 27 has been overcome in view of the foregoing.

<sup>4</sup> In support of this rejection, the Office Action cites to MPEP § 2112.01. Applicants believe that the intended citation was to MPEP § 2112.02, which sets forth legal standards appropriate for process claims.

<sup>5</sup> Lipshutz, at col. 23, lines 1-16.

<sup>6</sup> *Id.* col. 23, lines 56-67.

<sup>7</sup> *Id.* col. 23, line 67 to col. 24, line 5.

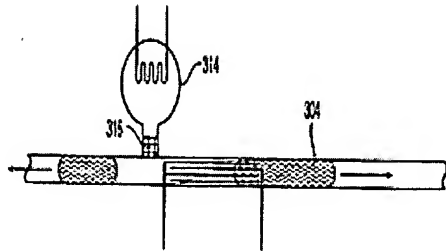


Fig. 13b

Claim 33 requires introducing the cell-containing liquid to a lysing zone and providing a gas pressure sufficient to separate a first portion of the cell-containing liquid located within the lysing zone from a second portion of the cell-containing liquid located upstream of the lysing zone to prepare a microdroplet comprising intracellular contents released from cells of the cell-containing liquid within the lysing zone. FIG. 13b of the

present application reproduced here illustrates an example of providing a gas pressure to prepare a microdroplet.

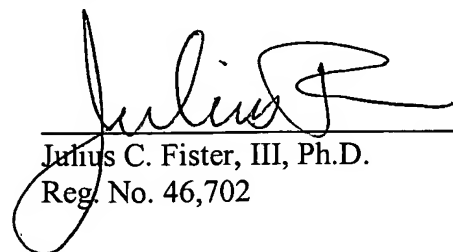
No device of Lipshutz performs the step of providing a gas pressure as required by claim 33. Moreover, there is no motivation in Lipshutz or elsewhere in the cited art to modify Lipshutz to perform the claimed method.

Applicants submit that the rejections of independent claims 1, 16, 27, and 33, and their respective dependent claims herein have been overcome at least for the reasons stated.

Enclosed is a \$225.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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